SECTION 00877

CALCIUM CHLORIDE BRINE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Calcium Chloride brine for anti-icing and de-icing.

1.2 PAYMENT PROCEDURES

A. Pay for accepted quantities at unit price per gallon delivered.

1.3 REFERENCES

A. APHA-AWWA-WEF: Standard Methods for the Examination of Water and Waste Water.

C. ASTM D 98: Standard Specification for Calcium Chloride.

D. ASTM D 1193: Standard Specification for Reagent Water.

E. ASTM D 1293: Standard Test Methods for pH of Water

F. ASTM D 1411: Standard Test Methods for Water-Soluble Chlorides Present as Admixtures in Graded Aggregate Road Mixes

1.4 SUBMITTALS

A. For each shipment, supply bill of lading showing:
   1. Type of material
   2. Destination
   3. Consignee's name

4. Date of Shipment
5. Truck identification
6. Net weight in English units
7. Bill of Lading number
8. Manufacturer

1.5 DELIVERY, STORAGE AND HANDLING

A. Contamination: Do not supply shipments contaminated with other materials.

1.6 QUALITY ASSURANCE

A. Sampling, supplier-delivered material:

1. Deliver to specified site.
2. Notify Department of delivery date and time.

B. Compliance: Supplier is liable for all UDOT testing costs of non-complying materials.

C. Principal Anti-Icing Chemical Deficiency - payment for the product will be reduced by a simple ratio of the actual percentage concentration (by weight) divided by the specified percentage concentration (by weight). Concentrations greater than specified will not be penalized.

D. Chemical Contaminants: If any delivery contains chemical contaminants in excess of the levels listed below, payment for the delivery shall be reduced by twenty-five percent (25%).

E. Two non-compliant shipments per contract year may result in contract termination.

PART 2 PRODUCTS

2.1 CALCIUM CHLORIDE BRINE

A. General:

1. Calcium Chloride Content - 32% by weight using ASTM D1411.

2. Chemical Constituents:

a. Do not supply products containing constituents exceeding total concentration limits listed in Table 1. Test according to methodology listed in 2.1.A.2.b below.

Table 1
Chemical contaminant limit stated as parts per million (ppm).

Chemical	**Concentration (ppm)**
Phosphorus	25.00
Arsenic	5.00
Copper	0.20
Lead	1.00
Mercury	0.05
Cadmium	0.20
Barium	10.00
Selenium	5.00
Zinc	10.00

b. Chemical constituent test methods:

1) Total phosphorus as described in "Standard Methods for the Examination of Water and Waste Water", APHA-AWWA-WEF. Total phosphorus shall be determined upon a 1% test solution. The Total Phosphorus value determined from the 1% solution is the value to be reported without being calculated for the dilution. The test solution should be prepared by placing 10 ml of sample into 500 ml of ASTM D1193 Type II distilled water contained in a 1 L volumetric flask to which 2.5 ml 1 + 1 sulfuric acid has been added. Swirl the contents and make up to 1000 ml with distilled water.

2) Total cyanide as described in "Standard Methods for the Examination of Water and Waste Water", APHA-AWWA-WEF.

3) Total arsenic, barium, cadmium, chromium, copper, lead, selenium and zinc: Atomic Absorption Spectrophotometry or Plasma Emission Spectroscopy as described in "Standard Methods for the Examination of Water and Waste Water", APHA-AWWA-WEF.

4) Total mercury: Cold Vapor Atomic Absorption Spectrophotometry as described in "Standard Methods for the Examination of Water and Waste Water", APHA-AWWA-WEF.

5) The pH must be 6.0 - 10.0 as determined by ASTM D 1293 except a dilution shall be made of 1 part chemical product to 4 parts distilled water before attempting a reading.

PART 3 EXECUTION

3.1 DELIVERY

A. Delivery: Deliver 4,000-gallon lots to locations listed on the bid schedule. Notify station supervisor twelve hours prior to delivery. Pump brine into on-site storage facilities at no additional cost using pumps with a minimum capacity of 500 gallons per minute.

B. Delivery Locations:

Table 2
Delivery Locations

Location	Address	Telephone
Parowan Maintenance Station	356 E Hwy 271 Parowan UT	435-529-7222
Manila Maintenance Station	200 East 400 North Manila UT	435-784-3534
Vernal Maintenance Station	318 N Vernal Ave. Vernal UT	435-438-5663